

## Project 4 - Cell image segmentation using deep learning (prof. Elena Casiraghi)

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### Preparation of the datasets

1. Two datasets from (<https://neurips22-cellseg.grand-challenge.org/dataset/>) were downloaded - training-labeled and tunings dataset.
2. Then we filtered datasets that only .tif and .tiff files remained (as was suggested in e-mail from prof. Casiraghi).
3. Images and labels were randomly cut on one end to ensure that final images will be squares.
4. then images were converted to grayscale (if were previously in color)
5. Resized to have common shape (480 x 480)
6. And lastly normalized to have values from range 0 - 1.

First 20 images from the training dataset were selected as validation datasets, thus the final training dataset contains 471 images. As a testing dataset 58 images from a tuning file were used.

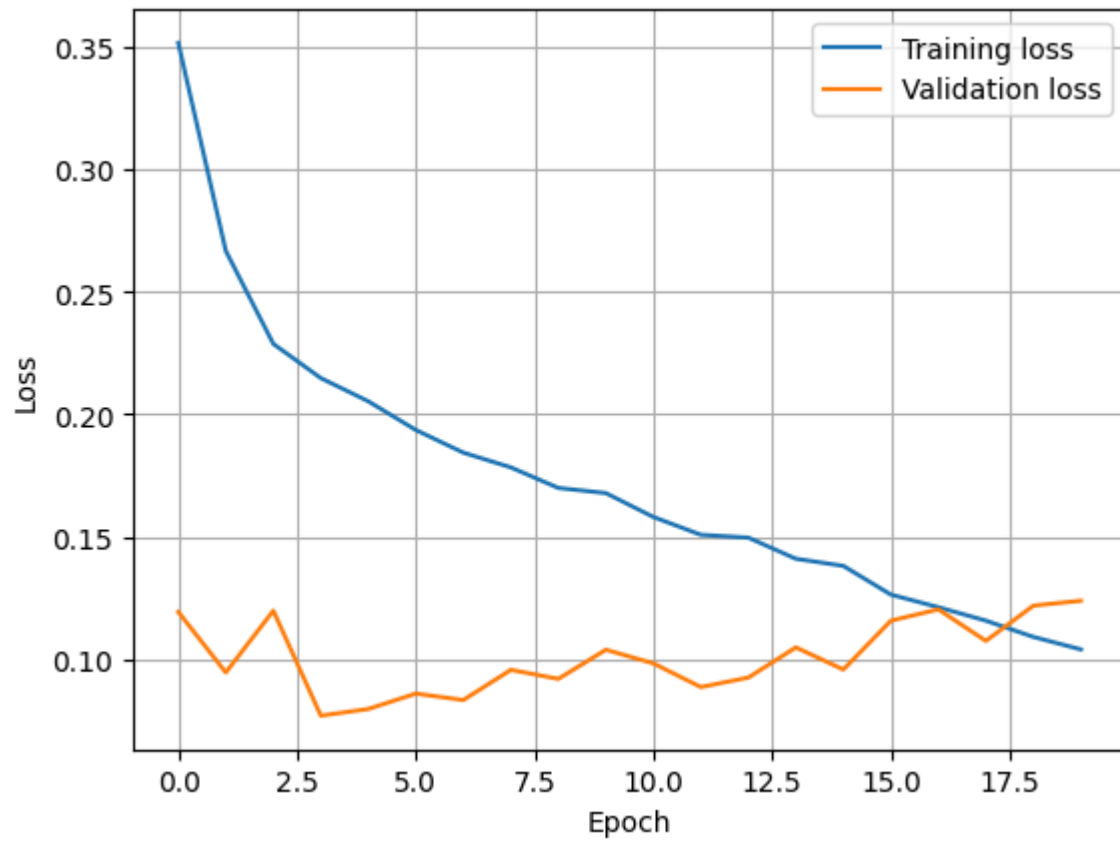
### base U-nets

To ensure that we can provide objective evaluation of trained de novo and retrained models, we first used several variations of U-net architecture from the laboratory, especially those with add and concat skip modes.

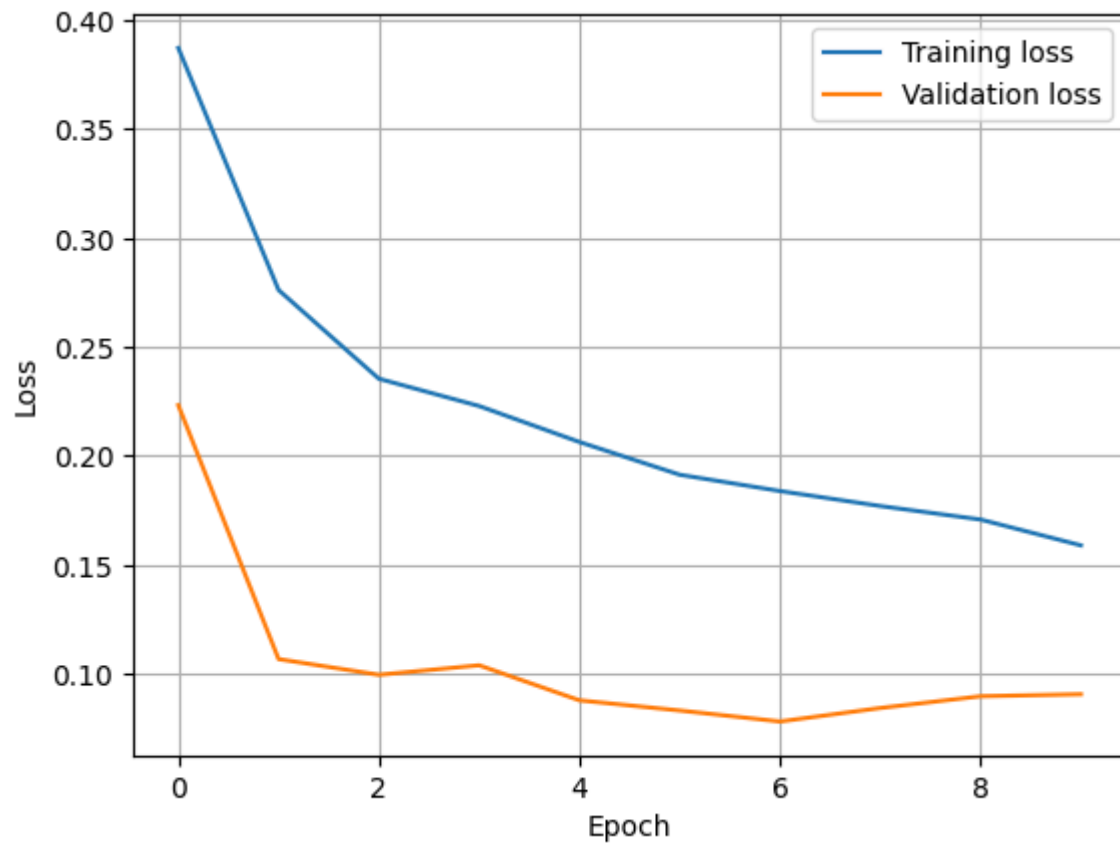
The final mean Dice from results on test dataset are provided in table:

Model	skip mode	upsampling	lr	epochs	is_batchNorm	Dice
Unet_1	add	transpose	0.001	20	no	0.437
Unet_2	add	interpolate	0.001	10	no	0.374
Unet_3	concat	transpose	0.001	10	no	0.336
Unet_4	concat	interpolate	0.001	10	no	0.442
UnetBatch_1	add	transpose	0.001	10	yes	
UnetBatch_2	add	interpolate	0.001	10	yes	
UnetBatch_3	concat	transpose	0.001	10	yes	
UnetBatch_4	concat	interpolate	0.001	10	yes	

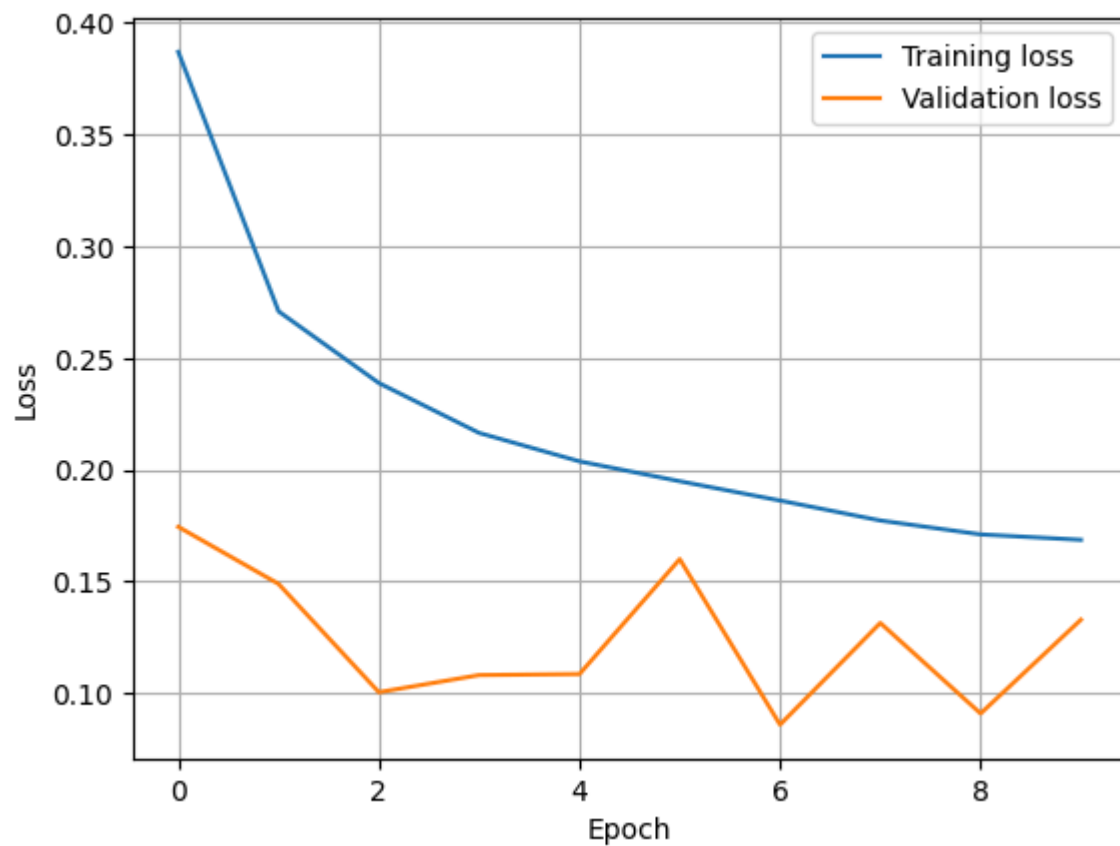
Corresponding plots:



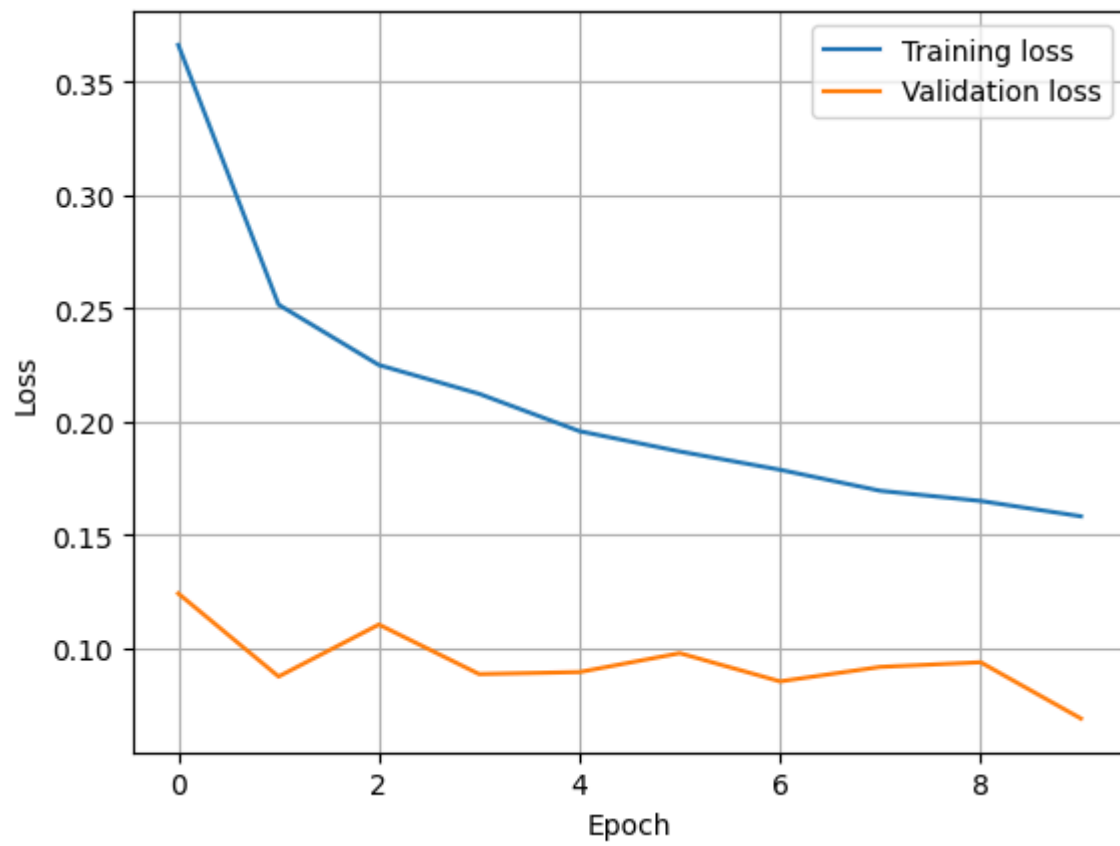
Unet\_1 #####



Unet\_2



Unet\_3 #####



Unet\_4